SHEET WITH SELECTIVELY ACTIVATED ADHESIVE

BACKGROUND OF THE INVENTION

This invention relates to articles which can be selectively secured to a mounting substrate by pressure sensitive adhesive. More particularly, this invention relates to a substrate in sheet form such as an index card having a writeable surface on one side and a mounting surface on a second opposite side, with a securing mechanism operable via a pressure threshold adhesive mechanism which is selectively exposed on the mounting side of the first substrate. Dependent upon a level of threshold pressure applied to the securing mechanism, the exposed pressure sensitive adhesive is either spaced from the mounting substrate or the article is deformable to bring the pressure sensitive adhesive into article securing engagement with the mounting substrate.

Memories are imperfect. Thus, we often write down things we want to remember at a later date. This may be a grocery list, a "to do" list, a speech, study notes, or other information we do not want to forget. For example, a student may take a series of blank index cards and turn them into "flash cards" by writing information on one (or both) sides of each card in preparing for an examination. An individual giving a speech may record notes for that speech on a series of index cards which can be stacked and easily transported or even pocketed. The ubiquitous Post-it® brand notes available from 3M Corporation have also proved quite useful for noting information to be recalled at a later date. A Post-it® brand note is a sheet of paper bearing a band of repositionable pressure sensitive adhesive across a back side thereof. A Post-it® brand note can be mounted on any number of surfaces, such as, for example, another sheet of paper, a wall, a mirror, a computer monitor, refrigerator door, etc. Post-It® brand notes are traditionally distributed in pad form, with adjacent notes adhered to one another by the repositionable pressure sensitive adhesive thereon. The notes stick together whenever placed adjacent one another, and thus are not easily shuffled or rearrangeable in stacked form without peel separation of the adhesive therebetween.

Index cards come traditionally in 3 x 5 inch or 4 x 6 inch formats and are typically made from stiff, more durable paper than note paper. There is no adhesive on an index card and it is easily shuffled among a stack of index cards. To stick an index card on a wall or other surface, adding a separate strip of tape may be used. However, it would be desirable to selectively adhere an index card to a surface (such as a wall, sheet of paper or the like) yet retain the ability to shuffle a stack of such index cards (i.e., not have adjacent index cards always adhere together) without having to go to the trouble of removing a tape strip from each index card.

BRIEF SUMMARY OF THE INVENTION

A sheet which may be selectively secured to a mounting surface includes at least a first substrate having a writeable surface on one side thereof and a mounting surface on a second opposite side thereof. The sheet also includes a securing mechanism including a pressure threshold adhesive mechanism which includes pressure sensitive adhesive exposed on the mounting side of the first substrate. In the absence of a threshold level of pressure applied to the securing mechanism, the pressure sensitive adhesive is spaced from the mounting substrate. The sheet is deformable such that a threshold level of pressure applied to the securing mechanism brings the pressure sensitive adhesive into sheet securing engagement with the mounting substrate.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an embodiment of the present invention, in the form of an index card, as viewed from a front major side thereof.

FIG. 2 is a view of the index card of FIG. 1, from an opposite back major side thereof.

FIG. 3 is a sectional view as taken along lines 3-3 in FIG. 1.

FIG. 4 is a sectional view as taken along lines 4-4 in FIG. 1.

FIG. 5 is top view of the index card of FIG. 4, as taken along lines 5-5 in FIG. 4.

FIG. 6 is a sectional view of the index card of FIG. 4, showing its adherence to a vertical substrate surface.

FIG. 7 is a top view of the index card and substrate of FIG. 6, as taken along lines 7-7 in FIG. 6.

FIG. 8 is a side elevational view of a stack of index cards such as the index card illustrated in FIGS. 1-7, sitting on a horizontal substrate surface with the exposed adhesive on each index card not activated.

FIG. 9 illustrates a second embodiment of the present invention, as viewed from the back side of an index card.

FIG. 10 illustrates a third embodiment of the present invention, as viewed from the top of an index card.

FIG. 11 illustrates the index card of FIG. 10, as adhered to a substrate surface.

FIG. 12 illustrates a fourth embodiment of the present invention, as viewed from the back side of an index card.

FIG. 13 illustrates a fifth embodiment of the present invention, as viewed from the back side of an index card.

FIG. 14 illustrates a sixth embodiment of the present invention, as viewed from the front side of an index card.

FIG. 15 illustrates a seventh embodiment of the present invention, as viewed from the back side of an index card.

FIG. 16 is a sectional view as taken along lines 16-16 in FIG. 15.

FIG. 17 is a sectional view of the index card of FIG. 16, showing its adherence to a vertical substrate surface.

FIG. 18 illustrates an eighth embodiment of the present invention, as viewed from the back side of an index card.

FIG. 19A is a sectional view as taken along lines 19-19 in FIG. 18.

FIG. 19B is a section view of the index card of FIG. 18, showing its adherence to a vertical substrate surface.

FIG. 20 is a sectional view as taken along lines 20-20 in FIG. 18.

FIG. 21 illustrates a ninth embodiment of the present invention, as viewed from the back side of a note card.

FIG. 22A is a sectional view as taken along lines 22-22 in FIG. 21.

FIG. 22B is a sectional view of the note card of FIG. 21, showing its adherence to a vertical substrate surface.

FIG. 23 illustrates a tenth embodiment of the present invention, in a sectional view like the sectional view taken along lines 22-22 of FIG. 21.

Fig. 24 illustrates an eleventh embodiment of the present invention, in a sectional view like the sectional view taken along lines 22-22 of FIG. 21.

FIG. 25 illustrates a twelfth embodiment of the present invention, as viewed from the back side of a note card.

FIG. 26 illustrates a thirteenth embodiment of the present invention, as viewed from the back side of a note card.

FIG. 27A is a sectional view as taken along lines 27-27 in FIG. 26.

FIG. 27B illustrates a fourteenth embodiment of the present invention, in a sectional view like the sectional view as taken along lines 27-27 in FIG. 26.

FIG. 28 illustrates a fifteenth embodiment of the present invention, as viewed from the back side of a note card.

FIG. 29 is a sectional view as taken along lines 29-29 in FIG. 28.

FIG. 30 illustrates a sixteenth embodiment of the present invention, as viewed from the back side of a note card.

FIG. 31 illustrates the note card of FIG. 30, with a spacing portion thereof folded down and adhered to the back side of the note card.

FIG. 32 is a sectional view as taken along lines 32-32 in FIG. 30.

FIG. 33 is a sectional view as taken along lines 32-32 in FIG. 30, with the spacing portion of the note card partially folded.

FIG. 34 is a sectional view as taken along lines 34-34 in FIG. 31.

FIG. 35 is a seventeenth embodiment of the present invention, as viewed from the back side of a note card.

FIG. 36 illustrates the note card of FIG. 35, with a spacing portion thereof folded down and adhered to the back side of the note card.

FIG. 37 is a sectional view as taken along lines 37-37 in FIG. 35.

FIG. 38 is a sectional view as taken along lines 32-32 in FIG. 35, with the spacing portion of the note card partially folded.

FIG. 39 is a sectional view as taken along lines 39-39 in FIG. 36.

FIG. 40 illustrates an eighteenth embodiment of the present invention, as viewed from the back side of a note card.

FIG. 41 is a sectional view as taken along lines 41-41 in FIG. 40.

FIG. 42 illustrates a nineteenth embodiment of the present invention, as viewed from the back side of a note card.

FIG. 43 illustrates a twentieth embodiment of the present invention, as viewed from the back side of a note card.

While the above drawing figures set forth several embodiments of the invention, other embodiments are also contemplated, as noted in the discussion. In all cases, this disclosure presents the invention by way of representation and not limitation. It should be understood that numerous other modifications and embodiments can be devised by those skilled in the art which fall within the scope and spirit of the principles of this invention. The figures may not be drawn to scale. Like reference numbers have been used throughout the figures to denote like parts.

DETAILED DESCRIPTION

In sheet form, a substrate has two major and generally planar sides. FIGS. 1 and 2 illustrate a sheet in the form of an index card 20 defined by a base layer 21 of material having a front side 22 and an opposite back side 24. Typically, both sides are writeable, i.e., adapted to accept writing or other indicia from a pencil, pen, high lighter, crayon, or from other indicia forming articles such as a printer. An index card will typically have, on one side (such as front side 22), a plurality of ruled lines 26 pre-printed thereon. The base layer 21 has an upper edge 28, lower edge 30, and left and right side edges 32 and 34, respectively.

While the present invention is applicable to any article in sheet form such as a sheet of paper, it is illustrated herein by index or note card embodiments and examples. A typical index card is made of paper, such as 90 pound weight paper, and is

0.0075 inches thick. Index cards come in two typical sizes, 3 x 5 inches and 4 x 6 inches. An index card may have rounded edges (such as illustrated in FIGS. 1 and 2), or may have squared off corners (such as illustrated in FIGS. 30 and 35).

The base layer 21 may be formed from sheet material such as paper, card stock, cardboard, plastic film, or some combination or laminate of such materials. Adjacent its upper edge 28, the layer 21 has a portion 40 removed therefrom to define an aperture therethrough which constitutes a paperless zone 42. This paperless zone 42 may take a number of forms, as illustrated herein. In one embodiment, the paperless zone 42 has a depth D and is elongated along upper edge 28 and includes an edge gap 44 of length L. In the embodiment illustrated in FIGS. 1 and 2, the paperless zone 42 is centered across the upper edge 28 of the base layer 21.

A cover layer 50 is adhered to the front side 22 of the base layer 21 of the index card 20 and extends over the paperless zone 42. The cover layer 50, as seen in FIGS. 3 and 4, has an outer pressure face 52 and an inner adhesive face 54, and a layer of pressure sensitive adhesive 56 is disposed on the inner face 54. The pressure sensitive adhesive 56 serves to adhere the cover layer 50 to the front side 22 of the base layer 21 of the note card 20, over and across the paperless zone 42 (which is shown in outline form by dashed lines 58 under cover layer 50 in FIG. 1). The cover layer 50 has a top edge 60 and a bottom edge 62, along with left and right edges 64 and 66, respectively. The top edge 60 of the cover layer 50 is aligned to extend across the edge gap 44 of the paperless zone 42, as illustrated in FIGS. 1, 2, 4 and 5.

A thickness T (FIG. 4) of the base layer 21 is sufficient, in the paperless zone 42, to space or separate the exposed adhesive 56 on the inner face 54 of the cover layer 50 from another surface contacting the back side 24 of the base layer 21. Thus, the inventive index card 20 can be handled and moved across a surface such as a sheet of paper, a desktop, a countertop, or other like index cards without adhering thereto via the exposed adhesive 56. This non-stick feature is also dependent, to some degree, upon the fact that the cover layer 50 does not sag appreciably (if at all) into the paperless zone 42 and toward the back side 24 of the base layer 21, even though it is unsupported across the paperless zone 42 and the edge gap 44 across the upper edge 28 of the base layer 21. In one embodiment, the upper edge 28 of the base layer 21 and the top edge 60 of the cover layer 50 are co-linear.

The layered arrangement disclosed above defines an index card assembly having a securing mechanism for allowing selective adherence of the index card 20 to a mounting substrate. As seen in FIGS. 6 and 7, a substrate 70 has a mounting surface 72. The thickness T of the base layer 21 prevents adherence of the exposed adhesive 56 in the paperless zone 42 to the mounting surface 72 in the absence of a threshold level of

pressure applied against the outer face 52 of the cover layer 50 within the area defined by the paperless zone 42. However, when such a threshold level of pressure is so applied, the cover layer 50 is sufficiently flexible and deformable so that at least a portion of the exposed adhesive 56 is brought into abutting engagement with the mounting surface 72 to adhere thereto. This relationship is illustrated in FIGS. 6 and 7. The pressure applied would typically be manual, such as by pressing against the outer face 52 of the cover layer with a finger or thumb of a user. This externally applied compressive force would typically be exerted in a direction substantially normal to the cover layer 50 and is, of course, to create an adhesion peel force of adhesive 56 after activation by the user which is greater than the adhesion peel force (which is zero) exhibited prior to activation by the user, and which is sufficient to adhere the index card to a target mounting surface. The threshold level of pressure can vary, dependent upon the nature of the material of the cover layer 50 (e.g., its resiliency), the thickness T of the base layer 21 in the paperless zone 42, the aggressiveness of the adhesive 56 and the nature of the mounting surface 72 of the substrate 70, among other things. In one embodiment, the threshold level of pressure refers to the kind of pressure an average user would normally apply using a finger or hand to adhere a pressure sensitive adhesive coated film, such as a strip of Scotch® brand adhesive tape, to a generally smooth surface such as a sheet of paper, a wall or a countertop. The target surface does not necessarily have to be flat. For example, it may be curved such as a pipe, TV screen or coffee cup.

The deformed portion of the cover layer 50 is shown as portion 50a, which is deformed or bowed at edge portions 75 to bring the adhesive 56 thereon into adhering engagement with the mounting surface 72. In this manner, the index card 20 may be affixed to a wall, window or other vertically oriented surface and will be retained there by the adhesive 56. Thus, one can stick an index card up for study or memory purposes. Upon removal of the index card 20 from the substrate 70, the cover layer 50 reverts to the form illustrated in FIGS. 4 and 5, thereby again spacing the adhesive 56 from the back side 24 of the base layer 21. The index card 20 can then be placed in a stack 80 of note cards 20, such as illustrated in FIG. 8 (or even shuffled among other like index cards) without the index cards sticking to each other or to a horizontal surface 82 upon which the stack 80 may be placed. In FIG. 8, the index cards 20 have been arranged top to bottom, and are viewed from the top edges of the index cards 20, thereby illustrating the paperless zone 42 and edge gap 44 of each index card 20. When in this orientation, firm pressure applied across the stack 80 (such as illustrated by pressure P in FIG. 8) would cause all the index cards 20 in the stack 80 to stick together, with adjacent cover layers 50 in adherence via exposed adhesive 56.

In one embodiment, the cover layer 50 is formed from a polymer film which is deformable upon application of the threshold level of pressure to urge the adhesive 56 thereon into contact with a mounting surface (as seen in FIGS. 6 and 7). Upon release of that pressure (and peel release of the adhesive 56), the cover layer 50 substantially returns to its undeformed original shape (as seen in FIGS. 4 and 5). The outer face 52 of the cover layer 50 may also be a writeable surface. In addition, the outer face 52 of the cover layer 50 may bear indicia for aesthetics or advertising purposes (such as graphics which may be pre-printed on the cover layer 50), or to facilitate visually sorting the index cards 20. In one embodiment, that indicia includes a color (e.g., the entire outer face 52 of the cover layer may be coated with a layer of colorant such as green, blue or red) to make it distinctive relative to the front side 22 of the base layer 21 (which is typically white).

The adhesive in all embodiments disclosed herein is applied to its supporting surface in a generally uniform thickness, and may be a permanent or repositionable pressure sensitive adhesive. The use of a repositionable pressure sensitive adhesive allows the index card to be adhered to a mounting surface multiple times without leaving any appreciable adhesive residue behind, and allows for the easy rearrangement of the relative positions of the index cards, which may be, for example, adhered upon a wall. Essentially, the present invention provides a means for sticking and holding index cards on another surface "on demand".

For adhesion purposes, improved adherence appears to be attained when the paperless zone includes an open edge across which adhesive may be disposed (i.e., the edge gap 44). In other words, the paperless zone 42 is not surrounded on all sides by portions of the layer 21. The edge gap 44 provides an area of adhesive 56 which is spaced linearly from any edge or portion of the layer 21 having a thickness T, and thus facilitates the deformation of the cover layer 50 and the adherence of the adhesive 56 on the cover layer 50 to a mounting substrate surface.

The index card 20 of FIGS. 1-8 illustrates one embodiment of the present invention. FIGS. 9-17 illustrate alternative embodiments. In FIG. 9, a note card 120 is constructed with a base layer 121 otherwise the same as the note card 20, but has a paperless zone 142 which is smaller in area and shaped differently, although still presenting an edge gap 144 along an upper edge 128 of the base layer 121. In FIG. 9, the paperless zone 142 is illustrated as a semicircle or near semicircle, and is viewed from a back side 124 of the index card 120. A cover layer 150 is provided on a front side of the index card 120, and a pressure sensitive adhesive 156 on a back face 154 of the cover layer 150 is visible through the paperless zone 142. A bottom edge 162 of the cover layer 150 is illustrated by the dashed lines in FIG. 9.

FIG. 10 illustrates yet another embodiment of the present invention, in the form of a note card 220. Other than the difference in the form of its cover layer 250, the note card 220 is similar in construction to the note card 120 of FIG. 9. FIG. 10 shows the note card 220, as viewed from the upper edge thereof. The base layer 221 has a paperless zone 242 thereon, with the cover layer 250 adhered to a front side 222 of the layer 221 by pressure sensitive adhesive 256. The cover layer 250 does not extend across the entire front face 222 of the base layer 221 but only slightly overlaps the edges of the paperless zone 242 (enough overlap to facilitate bonding of the cover layer 250 to the base layer 221). FIG. 11 illustrates the index card 220 with the cover layer 250 deformed to bring the adhesive 256 thereon into adhering engagement with a mounting substrate surface 272.

FIG. 12 illustrates yet another form of inventive index card 320, having an alternatively shaped paperless zone 342. Other than the shape of the paperless zone 342, the index card 320 has the same attributes as the index cards 20, 120 and 220 disclosed above. In the index card 320, a base layer 321 has a paperless zone 342 which is V-shaped. As with previous embodiments, however, the paperless zone has an edge gap 344 exposed along an upper edge 328 of the base layer 321. A cover layer 350 is adhered to a front side of the base layer 321 by pressure sensitive adhesive 356, with the adhesive 356 visible (and operable) via the paperless zone 342, as viewed from a back side 324 of the index card 320 in FIG. 12.

FIG. 13 illustrates another embodiment of an inventive index card 420. Other than the form of the paperless portions of the index card 420, this embodiment has the same attributes as the index cards 20, 120, 220 and 320 disclosed above. In this embodiment, a plurality of paperless zones 442 are provided along an upper edge 428 of a base layer 421 of the index card 420. A cover layer 450 extends across a front face of the layer 421 such that pressure sensitive adhesive 456 is exposed across each of the paperless zones 442.

As can be appreciated, the shape of the paperless zone on an index card assembly of the present invention can take many forms, and there can be multiple exposed adhesive zones. While the shape or shapes of the paperless zone(s) may be defined in part by ornamental considerations, each paperless zone is formed to provide an edge gap across the upper edge, side edges or bottom edge of the index card of sufficient distance that the cover layer can be deformed against a mounting surface and not be unduly constrained in that deformation by a nearby thickness of a portion of the base layer of the index card. On the other hand, when the cover layer is not deformed by an application of sufficient pressure, the adhesive is spaced from (i.e., recessed into) the back side of the index card.

In the embodiments of the present invention discussed above, only one side of the index card assembly is selectively self-adhereable to a mounting surface using

recessed and exposed adhesive. In an index card 520 embodiment illustrated in FIG. 14, both sides of the index card may be so mounted. The index card 520 illustrated in FIG. 14 has a base layer 521 with a cover layer on each of its major sides, adjacent top and bottom edges thereof. FIG. 14 illustrates a front side 522 of the base layer 521 of the index card 520, with a cover layer 550 adhered thereto, adjacent upper edge 528. A paperless zone 542 adjacent the upper edge 528 is illustrated by dashed lines 558 and defines an edge gap 544 across the upper edge 528. Pressure sensitive adhesive is thus exposed on a back face of the cover layer 550, across the paperless zone 542. In addition, a second paperless zone 582 is removed adjacent a lower edge 530 of the base layer 521. The second paperless zone 582 also defines a second edge gap 584 across the lower edge 530 of the base layer 521. A second cover layer 590 is formed similar to the cover layer 550, and has a back face 594 adhered to a back side of the base layer 521 by pressure sensitive adhesive 596. The adhesive 596 is thus exposed on the front side 522 of the base layer 521, across the second paperless zone 582. As a result, the index card 550 can be adhered to a substrate surface on either its front side or its back side. When not adhered, the thickness of the base layer 521 spaces the exposed adhesive on both sides of the index card 520 from adjacent abutting surfaces, thereby allowing the index card to be freely moved about, stacked or reshuffled. Other than the addition of an oppositely facing area of exposed adhesive, the index card 520 of this embodiment has the same attributes as the index cards 20, 120, 220, 320 and 420 discussed above.

FIGS. 15-17 illustrate another embodiment of an inventive index card. In this embodiment, index card 620 has a base layer 621, but the base layer 621 does not necessarily have a paperless zone or associated cover layer. An area or land 625 is embossed in the base layer 621 to create a recess 627 on a back side 624 thereof (see FIG. 16). The embossed area 625 may be formed so that an opposite area on a front side 622 of the base layer 621 has no surface discontinuities, or it may be formed so that a slightly raised area 629 is formed on the front side 622.

A layer of pressure sensitive adhesive 657 (like the adhesives disclosed above) is disposed in the recess 627. However, an exposed surface 659 of the adhesive 657 is spaced from the back side 624 of the base layer 621 so that the adhesive 657 does not engage a surface which is merely in abutting engagement with the back side 624. The index card 620 is caused to be adhered to a substrate 670 having a mounting surface 672 (FIG. 17) by the application of a threshold level of pressure against the front side 622 of the base layer 621, opposite the adhesive 657. The embossed area 625 of the base layer 621 stretches slightly under this pressure, illustrated as pressure P in FIG. 17, to bring the exposed face 659 of the adhesive 657 into abutting engagement and adherence with the mounting surface 672. The base layer 621 is flexible enough to allow such stretching and

maintain the shape illustrated in FIG. 17 so that the index card 620 remains adhered to the substrate 670 (e.g., a wall, countertop, paper sheet, etc.). The embossed area 625 thus acts as a "pushbutton" for activating adherence of the index card 620 to the substrate 670. The embossed area 625 can be formed so that once the index card 620 is peeled away from the substrate 670, the embossed area 625 returns to its original recessed position (FIG. 16) or remains pushed out toward the back side 624 of the base layer 621. In this latter instance, a user can then "pop" or "snap" the embossed area 625 back to its original recessed position (FIG. 16) like an on/off switch. The index card 620, although differing in some construction elements from the other embodiments disclosed herein, has the same functional attributes. For example, it can be stacked and shuffled free without unintended adherence to other cards or surfaces.

FIGS. 18-20 illustrate another embodiment of an inventive index card, which is a further modification of the embodiment illustrated in FIGS. 15-17. In this embodiment, index card 620a has a base layer 621a. The base layer 621a has an upper edge 628, lower edge 630, and side edges 632 and 634. An area or land 625a is provided in the base layer 621a to create a recess 627a on an otherwise generally planar back side 624a thereof (see FIG. 19A). Recess 627a may be formed in the base layer 621a by any suitable process, such as embossing to compress the thickness of the base layer 621a or by sciving off a layer of the thickness of the base layer 621a. As illustrated in FIG. 19A, the recess 627a is formed so that an opposite area on a front side 622a of the base layer 621a has no surface discontinuities corresponding to the recess 627a.

A layer of pressure sensitive adhesive 657a is disposed in the recess 627a. An exposed surface 659a of the adhesive 657a is spaced from the back side 624a of the base layer 621a (which is otherwise free of adhesive) so that the adhesive 657a does not engage a surface which is merely in abutting engagement with the back side 624a. The index card 620a is caused to be adhered to a substrate 670a having a mounting surface 672a (see FIG. 19B) by the application of a threshold level of pressure against the front side 622a of the base layer 621a, opposite the adhesive 657a. The recess 657a of the base layer 621a stretches slightly under the pressure, illustrated as pressure P in FIG. 19B, to bring the exposed face 659a of the adhesive 657a into an abutting engagement and adherance with the mounting surface 672a. The base layer 621a is flexible enough to allow such stretching and maintain the type of deformed shape illustrated in FIG. 19B so that the index card 620a remains adhered to the substrate 670a (e.g. a wall, countertop, paper sheet, etc.).

In this embodiment, the recess 627a extends across the entire back side 624a of the index card 620a, from the side edge 632 to the side edge 634, as seen in FIG. 20. Thus, pressure applied (in direction P in FIG. 19B) at one or more locations across the

recess 627a urges the exposed face 659a of the adhesive 657 into an abutting engagement and adherance with the mounting surface 672a. The recess 627a is formed so that once the index card 620a is peeled away from the substrate 670a, the adhesive 657a essentially returns to its original recessed position (FIG. 19A). The index card 620a, although differing in some construction elements from the other embodiments disclosed herein, has the same functional attributes. For instance, upon the application of the threshold level of pressure, the index card 620 can be selectively adhered to a target surface. Once removed from the target surface, however, the index card 620a can still be stacked and shuffled without unintended adherence to other cards or surfaces.

A feature common to all of the embodiments disclosed herein is that pressure sensitive adhesive is exposed on a portion of the back side of a substrate in sheet form. In some embodiments, the pressure sensitive adhesive is exposed through a portion which has been removed from the base layer of the substrate to define an aperture or paperless zone. In other embodiments, the adhesive is exposed by being disposed within a recess provided on the back side of the base layer. In further embodiments, the adhesive is disposed on the back side of the base layer, and effectively "recessed" by means of one or more raised standoff elements which extend from the base layer to a height taller than the exposed face of the adhesive thereon. The standoff elements may constitute the back face of the base layer itself (such as in the embodiment of FIGS 1-8) or may be the back side of the base layer itself with a recessed defined therein, (such as in the embodiments of FIGS. 15-20), or the standoffs may constitute additional elements or features applied to the back side of the base layer or formed from the base layer, as disclosed in the embodiments of FIGS. 21-43.

In all embodiments disclosed herein and contemplated, the essential functional attributes are the same. When the base layer has its back side abutting another surface, it will not adhere thereto because the pressure sensitive adhesive thereon is spaced from that surface. When a threshold level of pressure is applied to the front side of the base layer, opposite the pressure sensitive adhesive thereon, the layer bearing the adhesive is sufficiently flexible and deformable so that at least a portion of the exposed adhesive is brought into an abutting engagement with the surface to adhere thereto. The threshold level of pressure would typically be manual, such as by pressing against the outer face of the layer bearing the adhesive layer with a finger or thumb of a user. This externally applied pressure (i.e., compressive force) would typically be exerted in a direction substantially normal to the base layer. This pressure creates an adhesion peel force of the adhesive after activation by the user which is greater than the adhesion peel force (which is zero) exhibited prior to activation by the user and which is sufficient to adhere the index card to a target mounting surface. The threshold level of pressure can vary, dependent

upon the nature of the material of the layer bearing the adhesive (e.g., its resiliency), the thickness of the base layer, the aggressiveness of the adhesive and the nature of the surface to which the index card is being adhered, among other things. Another feature of all of the embodiments disclosed herein is that multiples of each base layer embodiment may be stacked or shuffled without the base layers sticking to one another (without an application of pressure normal to the plane of the base layers). This allows the base layers (for example, in the form of index cards) to be reordered in a stack without sticking to one another, so that the order of cards in the stack can be easily rearranged by a user. The "shuffleability" of base layers may be enhanced by providing a coating of a slip-enhancing adhesive release layer on a portion or on all of the front side of the base layer. In addition, when an appropriate adhesive is used, the base layer can be adhered to a surface, and then removed and reapplied to the same surface in a different location or to a different surface, as desired by the user, with leaving any appreciable adhesive residue on those surfaces once removed. As also noted above, in all embodiments herein both sides of the base layer are writeable, i.e., adaptable to accept writing or other indicia from a pencil, pen, highlighter, crayon or from other indicia forming articles such as a printer.

FIGS. 21 and 22 illustrate another embodiment of the present invention, as a sheet in the form of a note card or index card 720. The note index card 720 is defined by a base layer 721 of material having a front side 722 and an opposite back side 724. The base layer 721, viewed from the back side 724 in FIG. 21, has an upper edge 728, a lower edge 730, and side edges 732 and 734.

The base layer 721 may be formed from sheet material such as paper, card stock, cardboard, plastic film, or some combination or laminate of such materials. In most of the embodiments disclosed herein, a layer of pressure sensitive adhesive is disposed relative to the back face of the base layer adjacent its upper edge. In the embodiment shown in FIG. 21, a layer of pressure sensitive adhesive 756 is applied to the back face 724 and extends across the width of the base layer 721, from side 732 to side 734. The adhesive 756 is applied in a generally uniform thickness on the back side 724, and thus has a generally planer exposed surface 759. An upper raised element 761 is disposed adjacent the upper edge 728 of the base layer 721. In the embodiment of FIG. 21, the upper raised element 761 is elongated, generally linear, and extends along the upper edge 728 of the base layer 721. The upper raised element 761 is adhered to the surface 759 of the adhesive 756, and projects outwardly therefrom (relative to the back side 724 of the base layer 721) a standoff distance S_1 (see FIG. 22A) to an upper standoff surface 763. A lower raised element 765 may be similarly formed and adhered to the surface 759 of the adhesive 756. The lower standoff element 765 likewise projects outwardly relative to the back side 724 of the base layer 721 by a standoff distance S_2 (see FIG. 22A) to a lower

standoff surface 767. In one embodiment, the standoff distance S_1 is equal to the standoff distance S_2, but those distances are not necessarily equal. In other words, the exposed surface 759 of the adhesive has a first height relative to the back side 724 of the base layer 721, and the upper and lower standoff surfaces 763 and 767 have greater heights than the first height.

The standoff distances S_1 and S_2 of the raised elements 761 and 765, respectively, are sufficient to space or separate the exposed surface 759 of the adhesive 756 on the back side 724 of the base layer 721 from contacting an adjacent surface. Thus, the inventive note card 720 can be handled and moved across an adjacent surface such as a sheet of paper, a desktop, a countertop or other like note cards without adhering thereto by the adhesive 756. Any contact by the note card 720 with the adjacent surface is via the upper and lower standloff surfaces 763 and 767, and via portions of the back side 724 of the base layer 721 which are free of adhesive. The raised elements 761 and 763 effectively provide borders for a recess zone 769 therebetween where the exposed surface 759 of the adhesive 756 is disposed. The space between the raised elements 761 and 765 is shown in FIG. 21 as spacing Z. The non-stick feature of the note card 720 is also dependent, to some degree, upon the length of spacing Z, the height of the standoff distances S_1 and S_2, and the stiffness of the base layer 721 in the area thereof bearing the adhesive 756. These attributes are designed so that the base layer 721 does not sag appreciably (if at all) in the recess zone 769 defined for the adhesive 756 between the raised elements 761 and 765.

The arrangement disclosed in FIGS. 21 and 22A defines a note card assembly having a securing mechanism for allowing selective adherence of the note card 720 to a mounting substrate. As seen in FIG. 22B, a substrate 770 has a mounting surface 772 is shown. The standoff distances S_1 and S_2 prevent adherence of the exposed surface 759 of the adhesive 756 in the recess zone 769 with the mounting surface 772 in the absence of a threshold level of pressure applied against the first side 722 of the base layer 721 opposite the adhesive 756. However, when such a threshold level of pressure is so applied, the base layer 721 is sufficiently flexible and deformable so that at least a portion of the exposed surface 759 of the adhesive 756 is brought into an abutting engagement with the mounting surface 772 to adhere thereto. This relationship is illustrated in FIG. 22B. As noted above, the pressure applied would typically be manual, such as by pressing against the first side 722 of the base layer 721 with a finger or thumb of a user, in direction P as shown in FIG. 22B. While the adhesive 756 is activated to retain the note card 720 in adherence to the substrate 770, the base layer 721 may deform on its first side 722, although such deformation may not even be visually or tactilally appreciable to a user. The raised elements 761 and 765 may, under pressure P, compress slightly, but still retain

sufficient height to space the base layer 721 from the mounting surface 772, as seen in FIG. 22B. Although two parallel raised elements are shown, in some embodiments, three or more may be desired.

In FIG. 22B, the deformed portion of the base layer 721 is shown as portion 721a, which is deformed or bowed at edge portions 775 adjacent the raised elements 761 and 765 to bring the exposed surface 759 of the adhesive 756 into adhering engagement with the mounting surface 772. In this manner, note card 720 may be fixed to a wall, window or other vertically oriented surface and will be retained there by the adhesive 756. Thus, one can stick a note card up for study or memory purposes. Upon removal of the note card 720 from the substrate 770, the deformed base layer 721a reverts to the base layer 721 form illustrated in FIG. 22A. The adhesive 756 thus again has its exposed surface 759 spaced from contact with another surface within the recess zone 769 defined between the raised elements 761 and 763. The note card 720 can then be placed in a stack of note cards or shuffled among other like note cards without the note cards sticking to each other or to a horizontal surface upon which the stack of note cards may be laid. When a plurality of such note cards are arranged with their upper edges along the same side of such a stack, firm pressure applied across the stack (in like direction to pressure P in FIG. 22B) causes the note cards in the stack to stick together, with adjacent base layers in adherence via the exposed adhesive.

The upper and lower raised elements may be formed in a variety of ways and from a variety of materials. For instance, the upper and lower raised elements may be a discreet layer of a sheet material, a layer of tape material, or a layer of a coating material that has been applied, such as illustrated in FIGS. 22A, 22B and 23. In the embodiment of FIGS. 22A and 22B, the upper and lower raised elements are strips of material which are adhered to the adhesive 756, (such as a strip of paper, polymer, tape, or a coating of a material such as a varnish coating).

FIG. 23 illustrates an alternative embodiment for a note card 720a where an upper raised element 761a and a lower raised element 765a are not adhered to the adhesive 756, but are bonded directly to the back side 724 of the base layer 721. The securing mechanism of the note card 720a illustrated in FIG. 23 functions in the same manner as described above, since the upper and lower raised elements 761a and 765a function to define a recess zone 769a for the adhesive 756 and serve to space and standoff the exposed surface 759 of the adhesive 756 from a mounting surface or the surface of an adjacent note card.

Another example of the formation of upper and lower raised elements is illustrated in FIG. 24. In this embodiment, a note card 720b has an upper raised element 761b and a lower raised element 765b which are each formed by a bead of material which

has been deposited on the back side 724 of the base layer 721 (the bead may be deposited over the adhesive 756 or adjacent thereto). The bead material (which could be formed, for example, from an aqueous based glue which hardens upon exposure to ambient conditions) has an outermost standoff surface (its surface spaced farthest from the back side 724 of the base layer 721) which defines the standoff distance from the exposed surface 759 of the adhesive 756. The securing mechanism of the note card 720b functions in the same manner as described above. The standoff distance for each raised element 761b and 765b is again a distance sufficient to space the exposed surface 759 of the adhesive 756 in a reces zone 769b from another surface contacting the back side 724 of the base layer 721, in the absence of an application of the threshold level of pressure.

In the embodiments illustrated in FIGS. 21-24, the upper and lower raised elements are shown as continuous strips of material. In alternative embodiments, the upper and lower raised elements may discontinuous, such as upper raised element 761c and lower raised element 765c on a note card 720c, as seen in FIG. 25. The upper and lower raised elements 761c and 765c can be aligned over the adhesive 756 or adjacent thereto, and although not continuous, are aligned in a generally linear and parallel arrangement. The separated segments of the upper and lower raised elements may be the same length or differing in length, so long as the raised elements serve the function of providing the standoff distance necessary to prevent unattended adhesion of the exposed surface 759 of the adhesive 756 but still provide the "on-demand" adhesive characteristic for the note card 720c.

FIG. 26 illustrates alternative discontinuous strips in the form of a plurality of upper and lower raised elements 761d and 765d, respectively, on a note card 720d. These raised elements are still, as shown, aligned in a generally linear and parallel arrangement with the adhesive 759 disposed in a recess zone 769d (see FIG. 27A) formed therebetween. FIG. 27A illustrates that elements 761d and 765d may be formed from discreet drops or masses of bead material deposited on the second side 724 of the base layer 721. Such drops may be deposited in liquid form which then harden or cure upon exposure to ambient conditions at a height which provides the requisite standoff distances for both the upper raised element 761d and lower raised element 765d, relative to the exposed surface 759 of the adhesive 756, thereby achieving the "on-demand" adhesive characteristics discussed above for the securing mechanism.

Another alternative means for forming a plurality of discreet standoff elements is illustrated in FIG. 27B. In this embodiment, upper and lower raised elements 761e and 765e are formed by arrays of perforations 777 made in a base layer 721e. Each perforation 777 is made from a front side 722e to a back side 724e of the base layer 721e. Thus, a portion of the base layer 721e material is deformed and projects outwardly from

the back side 724e to define a peak as the upper raised element 761e or the lower raised element 765e. The upper and lower raised elements 761e and 765e project sufficiently from the back side 724e of the base layer 721e to provide the requisite standoff distance and resultant functional advantages of the securing mechanism, as defined above. A recess zone 769e is effectively defined between the array of upper raised elements 761e and the array of lower raised elements 765e. Pressure sensitive adhesive 756 is disposed in that recess zone 769e and the standoff distance provided by the upper and lower raised elements 761e and 765e separates the exposed surface 759 of the adhesive 756 from any abutting surface (until application of the threshold level of pressure, as discussed above). Perforations 777 can be made through the adhesive 756 or alongside the adhesive 756. The perforations can be holes, circles, dash lines or any geometry which is suitable to provide the requisite standoff distance.

As the note card 720e is used (i.e. the adhesive is activated by pressure, peeled off a surface and then reactivated by pressure again, perhaps multiple times), the upper and lower raised elements 761e and 765e can decrease in height because they are deformed when pressed against a mounting surface to activate the adhesive 756. However, the upper and lower raised elements 761e and 765e do not become, over use, so decreased in height that they fail to maintain a sufficient standoff distance for the adhesive 756.

In a note card 720e of the form shown in FIG. 27B, the perforations 777 defining the lower raised elements 765e can also be used to facilitate folding an upper section 779 of the base layer 721e over as a hinge. When this is done, the adhesive 756 on the upper section 779 is brought into adhering engagement with the back side 724e of the base layer 721e below the lower raised elements 765e. This covers all exposed adhesive, thus eliminating the possibility of the note cards 720e sticking to the surfaces of like note cards via the adhesive, and also keeps the adhesive from becoming contaminated with dirt, paper, fibers, etc. The folded over, adhesive bearing upper section 779 of the base layer 721e can later be unfolded to expose the adhesive and again provide "on-demand" adhesion of the note card 720e to a target surface.

FIGS. 28 and 29 illustrate another embodiment of a note card 720f having upper and lower raised elements 761f and 765f. In this embodiment, the raised elements 761f and 765f are formed by score lines defined in a base layer 721f of the note card 720f. Like the perforations of FIG. 27B, the scoring is done from a front side 722f of the base layer 721f. A score valley or crease 781 is thus defined for each score line on the front face 722f of the base layer 721f. Likewise, a resultant score line projection is formed on a back side 724f of the base layer 721f, thereby defining the upper raised element 761f or the lower raised element 765f. The raised elements 761f and 765f again are formed to

provide a sufficient standoff distance relative to the adhesive 756, and specifically relative to the exposed surface 759 of the adhesive 756 which is in a recess zone 769f defined between the upper and lower raised elements 761f and 765f. The upper and lower raised elements 761f and 765f are thus formed as ribs from the material of the base layer 721f. Those ribs may constitute a single rib extending across the note card 720f or a plurality of ribs thereon (i.e. a discontinuous rib). The use of a score line to form the lower standoff element 765f also provides, in this embodiment, a hinge along the lower raised element 765f which can be used to fold over an upper section 779f of the base layer 721f to adhere the upper section 779f to the backside 724f of the base layer 721f via the adhesive 756. Like the embodiment of FIG. 27B, the folded over, adhesive ring upper section 779f of the base layer 721f can later be unfolded to expose the adhesive of the securing mechanism and again provide "on-demand" adhesion of the note card 720f to a target surface.

In the embodiments of the present invention discussed above, the inventive index or note card does not require manipulation by a user to define the requisite standoff distance on the back side thereof for use. For example, note card assembly shown in the embodiments 1-14 is formed with the adhesive recessed from unintended contact with an abutting surface of the back side of the note card. In the embodiments of FIGS. 15-20, the back side of the inventive note card likewise has a recess formed therein so that an exposed face of the adhesive is spaced from the back side of the base layer of the index card. In the embodiments illustrated in FIGS. 21-29, the adhesive may be disposed directly on the back side of the base layer of the index card, but raised standoff elements are also provided so that the exposed surface of the adhesive is lower in height than the height of the standoffs, and thus again recessed relative to an adjacent surface which the back side of the card may contact. In each of the above described embodiments, the adhesive is provided on the index card already in a pre-defined recess zone which, by one means or another, establishes the requisite standoff distances to prevent adhesive from unintended contact with an abutting surface.

In alternative embodiments, some degree of user manipulation may be required to define the standoff distance on the back side of a note card. For example, the embodiment illustrated in FIGS. 30-34 requires folding of a portion of the note card to create the height differential on the back side of the note card which serves as the standoff distance. A sheet in the form of a note card 820 is defined by a base layer 821 having a front side 822 and an opposite back side 824. The base layer 821 has an upper edge 828, lower edge 830 and side edges 832 and 834. In this embodiment, adhesive 856 is disposed in a band adjacent the upper edge 828 of the base layer 821, and extends to a score line 829 (shown in dashed lines), which is parallel to the upper edge 828 and spaced from it. Below the score line 829, the back side 824 of the base layer 821 is free of adhesive. The

adhesive 856 is disposed on the back side 824 of the base layer 821, and extends from side edge 832 across the note card 820 to side edge 834.

The base layer 821 has a cut 831 therethrough, formed within the band of adhesive 856. The cut 831 extends from a first end 833 on the score line 829 toward the upper edge 828 of the base layer 821 to a first turn 835. The cut 831 then has a portion 837 which extends parallel to the upper edge 828 of the base layer 821 (and is spaced therefrom) which extends to a second turn 839. The cut 831 then extends from the second turn 839 away from the upper edge 828 of the base layer 821 to a second end 841 of the cut 831 which is on the score line 829. The first end 833 and the second end 841 of the cut 831 are spaced apart across the base layer 821, as illustrated in FIG. 30.

That portion of the base layer 821 defined by the upper edge 828 thereof, the cut 831 and the score line 829 (on each outer side of the cut 831) is defined as a spacing portion 845 of the base layer 821. The spacing portion 845 may be folded over along a score line 829 and adhered against the back side 824 of the base layer 821 by the adhesive thereon, so that the note card 820 takes on the form illustrated in FIG. 31. This folding sequence is illustrated in FIGS. 32, 33 and 34, where FIG. 32 shows the note card 820 in an unfolded state, FIG. 33 shows the note card 820 in a partially folded state, and FIG. 34 shows the note card 820 in a fully folded state. Once folded as described and shown, an upper non-folded tab portion 847 constitutes the uppermost part of the note card 820, as seen in FIG. 31. In this embodiment, the tab portion 847 bears adhesive 856 thereon. That portion of the band of adhesive 856 which is disposed on the spacing portion 845 (referenced as adhesive 857) is used to adhere the spacing portion 845 to the back side 824 of the base layer 821, as seen in FIGS 31 and 34.

The thickness of the spacing portion 845 of the base layer 821 thus defines a standoff distance S_3 (see FIG. 34) for spacing the adhesive 856 on the tab portion 847 from an adjacent surface. The folded over spacing portion 845, although not immediately adjacent an exposed surface 859 of the adhesive 856 other than at the first and second ends 833 and 841 of the cut 831, still provides a sufficient height differential to prevent unintended contact of the exposed surface 859 with an adjacent surface such as a mounting surface or adjacent note card surface. The adhesive is thus effectively "recessed" by means of the thickness (standoff distance S_3) of the folded over spacing portion 845. In essence, a front face 823 on the spacing portion 845 becomes its back face when the spacing portion 845 is folded over, and acts as a standoff surface 825 for the adhesive 856.

As noted above, the essential securing mechanism functional attributes of the note card 820 are like those of the other embodiments disclosed herein. When the base layer 821 has its back side 824 abutting another surface, it will not adhere thereto because

the pressure sensitive adhesive 856 thereon (on the non-folded tab portion 847) is spaced from that surface. When a threshold level of pressure is applied to the front side 822 of the base layer 821 (on the front side of non-folded tab portion 847), the base layer 821 is sufficiently flexible and deformable so that at least a portion of the exposed adhesive 856 is brought into an abutting engagement with a surface to adhere thereto. In addition, when an appropriate adhesive is used, the base layer can be adhered to a surface and then removed and reapplied to the same surface in a different location or to an altogether different surface, as desired by the user, without leaving any residue on those surfaces once removed. With the spacing portion 845 folded over and adhered to the back side 824 of the base layer 821 (as illustrated in FIGS. 31 and 34), the note card 820 is also then in a configuration where it may be stacked or shuffled without sticking to other like note cards or to a substrate surface (at least not without an application of pressure normal to the plane of the base layer, in the area of the tab portion 847).

In this embodiment, when the index card 820 is in its unfolded state (as illustrated in FIGS. 30 and 32), a plurality of such index cards may be aligned by their upper edges and then stacked and adhered together for dispensing purposes (e.g., like a stack of Post-it® brand notes such as are available from 3M Corporation, St. Paul, Minnesota). As a note card 820 from such a stack is desired for use, it may individually be peeled off of the stack, and if desired, the spacing portion 845 folded over so that the card assumes the form illustrated in FIG. 31. To facilitate separation of the adjacent cards, the front side 822 of the base layer 821 (along with the front face 823 of the attached spacing portion 845 thereof) may be coated with a slip-enhancing adhesive release layer (not shown). The shuffleability of the note card 820 once the spacing portion 845 has been folded over to the form seen in FIG. 31 may be facilitated by the fact that an adhesive release coating is now disposed on the standoff surface 825 which is adjacent the exposed surface 859 of the adhesive 856 on the back side 824 of the base layer 821.

FIGS. 35-39 illustrate another embodiment of the inventive note card. In this embodiment, a note card 820a is similar in all respects to the configuration of the note card 820 in FIG. 30, except that the location of the band of adhesive is different. In this embodiment, the band of adhesive 856a begins at its upper edge along the score line 829 and extends downwardly therefrom to a lower edge 851 of the adhesive 856a, while still extending across the note card 820a from the side edge 832 to the side edge 834. The score line 829 is spaced below the upper edge 828 of the base layer 821. A cut 831 is provided in a similar manner, although the cut 831 is not disposed in this embodiment within the band of adhesive 856a, but above the band of adhesive 856a. The cut 831 begins at a first end 833 on the score line 829 and extends towards the upper edge 828 to a first turn 835, and then along a portion 837 which extends parallel to the upper 828 to a

second turn 839. From the second turn 839, the cut extends to a second end 841 which is on the score line 829. The first and second ends 833 and 841 of the cut 831 are spaced apart across the face of the note card 820a.

A spacing portion 845a is defined by the upper edge 828, the cut 831 and the score line 829. The spacing portion 845a can be folded over along the score line 829 and adhered to the back side 824 of the base layer 821 via the adhesive 856a thereon. FIG. 35 illustrates the note card 820 in an unfolded configuration, while FIG. 36 illustrates the note card with the spacing portion 845a in its folded over and adhered configuration. FIGS. 37, 38 and 39 illustrate the sequence of folding over the spacing portion 845a, relative to the note card 820a.

Although the band of adhesive 856a is in a different location in the embodiments of FIGS. 35-39 from the embodiments of FIGS. 30-34, once the spacing portion 845a of the note card 820a has been folded over (as shown in FIGS. 36 and 39), it again serves as the raised standoff element to define a recess zone for an exposed surface 859a of the adhesive 856a not covered by the spacing portion 845a. The spacing distance provided thereby is illustrated in FIG. 39 as spacing distance S_4, which is equal to the thickness of the spacing portion 845a. In this embodiment, the exposed surface 859a of the adhesive 856a is bounded on three sides thereof by portions of the spacing portion 845a, as defined by the shape of the cut 831. An upper non-folded tab portion 847a projects at the upper portion of the base layer 821a but does not bear adhesive thereon, as seen in FIG. 36.

Once the note card 820a has been placed in its folded over configuration (FIGS. 36 and 39), the securing mechanism can be activated by the application of a threshold level of pressure against the front side 822 of the base layer 821, at one or more locations opposite the exposed surface 859a of the adhesive 856a. As in previous embodiments, the base layer 821 is sufficiently flexible and deformable to permit at least a portion of the exposed surface 859a of the adhesive 856a to engage an abutting surface and to adhere to that surface in order to retain the note card 820a in place. Upon removal of the note card 820a from a mounting surface, the base layer 821 resumes its undeformed shape (as illustrated in FIG. 39) and is shuffleable, stackable or may be placed in a different location and adhered thereto by reapplication of the threshold level of pressure. In this embodiment, when the index card 820a is in it's unfold state (as illustrated in FIGS. 35 and 37), a plurality of such index cards may be stacked and adhered together for dispensing purposes of individual cards. Again, because the index cards 820A are intended, in a stacked configuration, to actually be adhered together, a slip-enhancing adhesive release layer (not shown) may be provided on the front side 822 of the base layer 821 of each index card 820a to facilitate separation of adjacent cards from the stack. As

noted above with respect to the embodiment illustrated in FIGS. 30-34, providing such an adhesive release layer may further enhance shuffleability of the note cards 820a once the spacing portion 845a has been folded over, since the standoff surface 825 has an adhesive release coating thereon.

Another embodiment of the inventive article of the present invention as illustrated in FIGS. 40-41. A sheet in the form of a note card or index card 920 is defined by a base layer 921 of a material having a front side 922 and an opposite back side 924. The base layer 921, viewed from the backside 924 in FIG. 40, has an upper edge 928, a lower edge 930, and side edges 932 and 934.

A layer of pressure sensitive adhesive 956 is applied to the back side 924 of the base layer 921. The layer of adhesive may be applied in a continuous band or in discrete and separated zones of adhesive, such as adhesive zones 956a, 956b, and 956c. In one embodiment, those adhesive zones may be defined by the shape of a spacer layer 911 applied over or adjacent the adhesive 956. The spacer layer 911 may be formed from a sheet of material adhered to the adhesive 956, or a separately adhereable tape material, or a coating of masking material which is applied over the back side 924 of the base layer 921.

In the embodiment illustrated in FIG. 40, the spacer layer 911 has an upper edge 912 which extends along the upper edge 928 of the base layer 924. The spacer layer 911 extends downwardly from its upper edge 912 toward the adhesive 956 and is formed to define boundaries for a "recess" zone bounding the adhesive 956 and to act as a standoff element for the adhesive 956. An edge 913 of the spacer layer 911 adjacent the adhesive 956 may include one or more arc shape portions 914 thereon. In this particular embodiment, each arc shaped portion 914 thus bounds the adhesive on three sides thereof, thereby effectively recessing an exposed surface 959 of the adhesive relative to a standoff surface 915 of the spacer layer 911. This relationship is illustrated in FIG. 41, where a standoff distance S_5 is shown between the exposed surface 959 of the adhesive 956 and the standoff surface 915 of the spacer layer 911.

The standoff distance S_5 is sufficient to space or separate the exposed surface 959 of the adhesive 956 on the back side 924 of the base layer 921 from contacting an adjacent surface. Thus, the inventive note card 920 can be handled and moved across an adjacent surface such as a sheet of paper, a desktop, a countertop, or other like note cards without adhering thereto by the adhesive 956. The spacer layer 911 may be formed to have lower depending sections 916 which may or may not extend below a lowermost edge 951 of the adhesive 956. The height of the spacer layer 911 relative to the height of the exposed surface 959 of the adhesive 956 (spacing distance S_5) and the shape of the spacing layer 911 relative to the shape of the exposed surface 959 of the adjacent adhesive

956 may be varied, but must be maintained in a relationship so that the securing mechanism function of the note card 920 is achieved. In other words, the note card 920 is shuffleable with respect to other like note cards, and can be laid against a mounting surface without adhering thereto, in the absence of the application of a level threshold pressure on the front side of the base layer opposite the exposed surface of the adhesive.

The pattern of a spacer layer or raised element relative to the exposed surface of the adhesive illustrated by the embodiment of FIG. 40 is but one example of a suitable pattern or shape for the inventive pressure activated securing mechanism arrangement. Other patterns are illustrated by other embodiments described herein, and additional illustrative patterns are illustrated in FIGS. 42-43.

In FIG. 42, a sheet in the form of a note card or index card 1020 is defined by a base layer 1021 having a structure similar to that of the base layers described above, such as base layer 721 of FIG. 21. As seen in FIG. 42, the base layer 1021 has a back side 1024, with an upper edge 1028, a lower edge 1030, and side edges 1032 and 1034.

A layer of pressure sensitive adhesive 1056 is applied to the back side 1024 of the base layer 1021. The layer of adhesive may be applied in a continuous band or in discreet and separated zones of adhesive, such as adhesive zones 1056a, 1056b, 1056c, etc. The shape of the adhesive zones may be defined by the shape of one or more raised elements 1061 spaced apart across the back side 1024 of the base layer 1021, from side edge 1032 to side edge 1034. In the exemplary embodiment illustrated in FIG. 42, each raised element is shown as a generally linear member extending from the upper edge 1028 of the base layer 1021 to a lower end adjacent a lower edge 1051 of the adhesive 1056, and the raised elements 1061 are parallel. The lower edge of each raised element 1061 may stop short of the lower edge 1051, be co-terminous therewith or extend beyond it. Each raised element 1061 may be applied over the adhesive 1051, or directly to the back side 1024 of the base layer 1021, between adjacent zones of adhesive 1056. Each raised element 1061 may be formed from a sheet of material such as paper or polymer, a separately adhereable tape material, or a coating of masking material (such as a varnish coating) which is applied over the back side 1024 of the base layer 1021.

In all forms of the raised element 1061, it serves the same standoff function as the raised elements or spacer layers described above, namely that the height of each raised element 1061 is taller than the height of an exposed surface 1059 of the adhesive 1056, with the differential in height being sufficient to space or separate the exposed surface 1059 of the adhesive 1056 from contacting a target or adjacent surface and adhering thereto, without the application of a threshold level of pressure. In other words, a "recess" is defined between adjacent raised elements 1061 for the exposed surface 1059 of the adhesive 1056.

FIG. 43 illustrates yet a further pattern or shape for defining a securing mechanism which includes a pressure threshold adhesive mechanism based on user selected activation of exposed pressure sensitive adhesive. In FIG. 43, a sheet in a form of a note card or index card 1120 is defined by a base layer 1121. The base layer is similar in structure to the base layers of previously disclosed embodiments, such as base layer 721 in FIG. 21. The base layer 1121 has (as seen in FIG. 43) a back side 1124, an upper edge 1128, a lower edge 1130, and side edges 1132 and 1134.

A layer of pressure sensitive adhesive 1156 is applied to the back side 1124 of the base layer 1121. The layer of adhesive 1156 may be applied in a continuous band or in discrete and separated zones of adhesive, such as adhesive zones 1156a, 1156b, 1156c, 1156d, etc. (as noted above, such adhesive zones may be defined by the shape of one or more raised elements, such as exemplary raised elements 1161 and 1165 applied over or adjacent the adhesive 1156). The raised elements may be formed from a sheet of material adhered to the adhesive 1156, or a separately adhereable tape material, or a coating of masking material such as a varnish which is applied over the back side 1124 of the base layer 1121.

In the embodiment illustrated in FIG. 43, the raised element 1161 is shown as a serpentine element extending across the back side 1124 of the base layer 1121, from its first side edge 1132 to its second side edge 1134. The raised element 1161 is shown as disposed within the band of adhesive 1156, but may extend at times beyond an edge of the adhesive 1156, such as beyond a lower edge 1151 thereof. In addition, while the raised element 1161 is shown having a uniform waveform, it may be nonuniform in wave length and amplitude. In the illustrative embodiment of FIG. 43, the raised element 1165 is shown as a mirror image of the raised element 1161, likewise having a serpentine form, and extending across the back side 1124 of the base layer 1121, from its side edge 1132 to its side edge 1134.

In one embodiment, a single raised element (such as raised element 1165) may be sufficient to provide the necessary standoff distance between an exposed surface 1159 of the adhesive 1156 and an abutting surface such as another note card or a wall or countertop. The raised elements, whether one raised element or more, are formed to define an effective "recess" for the exposed surface 1159 of the adhesive 1156 so that the inventive sheet has the "on-demand" pressure adhesion characteristic desired, yet is also shuffleable in the absence of the application of a threshold level of pressure against the front side of the sheet, opposite the adhesive thereon.

While the raised elements shown, for example, in FIGS. 21, 42 and 43, are illustrated as relatively narrow lines, it is contemplated that raised elements of various widths (such as the spacer layer 911 in FIG. 40 or spacing portion 845 in FIG. 30) will

suffice. In addition, other patterns for the raised element, such as a checkerboard or cross-hatch pattern, may suffice.

The operative layer bearing the adhesive which must deform to allow the adhesive to overcome the recess defined for it and to contact the target surface, must be sufficiently flexible to allow such contact and then resilient enough to resume its substantially original shape to allow the recess to be redefined once it is removed from the target surface. For the embodiments where the base layer serves this purpose, a base layer having a thickness of 0.004 inches to 0.010 inches is suitable, and more preferably from 0.004 inches to 0.008 inches, and most preferably 0.0075 inches. The standoff distance is another factor which affects the functional characteristics of the inventive sheet assembly. Standoff distances from 0.0005 inches to 0.010 are suitable, more preferably 0.002 inches to 0.006 inches, and even more preferably 0.0015 inches to 0.0025 inches. The spacing between separate raised elements, or between portions of a spacer layer defining a recess therebetween, is also a characteristic which serves to define the functional attributes of the inventive sheet assembly. Such a spacing distance may range from 0.25 inches to 0.75 inches, more preferably from 0.375 inches to 0.625 inches. As discussed above, other factors will influence the operability of the pressure threshold adhesive mechanism of the securing mechanism of the present invention, such as the aggressiveness of the adhesive that is used and the presence and characteristics of a slip resistant adhesive release coating that may be applied to the front side of the sheet. The shapes and relationships of the raised elements, recesses and spacer layers shown herein are merely exemplary, and not intended to limit the invention to a particularly disclosed orientation or arrangement.

The present invention is further illustrated by the following examples, but the particular apparatus and processes recited in this example, as well as other conditions and details should not be construed to unduly limit this invention. All materials and components are commercially available or known to those skilled in the art unless otherwise stated or apparent. These examples are illustrative in nature and are not intended to limit the invention in any way.

EXAMPLE SET A

As noted above, a number of variations can be made to the design of an inventive index card assembly without sacrificing utility. One specific example of an index card of the present invention would be a 3 x 5 inch card made of card stock. The card stock is 90 pound weight paper, which is 0.0075 inches thick. The corners are rounded with a 0.25 inch radius. The index card has printed blue lines on its front side for writing spaced horizontally across the longer dimension (5 inch dimension of the index card). The paperless zone along the upper edge of the index card is centered and has an edge gap (L) of approximately 2 inches. The paperless zone has a depth (D) of 0.438

inches, and has rounded interior corners of 0.50 inch radius, assuming a shape similar to that illustrated in FIGS. 1 and 2. A 0.5 inch wide film adhesive tape strip is adhered to the front side of the index card adjacent the upper edge thereof and over the paperless zone and edge gap. The film and adhesive construction used is the number 811 repositionable tape product available from 3M Corporation, St. Paul, Minnesota. The tape strip is formed of acetate, which is about 0.0016 inches thick, and has a coating of microsphere adhesive, coated to a depth of 0.0004 inches thick. The exposed adhesive on the back face of the film is recessed by the thickness of the card stock (0.0075 inches) from the back side of the index card. On a front face of the film, it is printed with a color coating, for use in end user sorting of the index cards.

EXAMPLE SET B

Static Angle Test (SAT) for Wall Hang

The static angle test is an applied load peel test where the peel angle and applied force are constant. The test measures the holding power of an adhesive sheet to a nearly vertical surface. Adhesive test samples of paper were cut to two inches wide and three inches in length. The adhesive strip on the back face of each sample is positioned so that it is parallel to the short dimension of the sheet, near its upper edge. Samples were equilibrated at constant temperature (22°C) and humidity (50%) for at least 24 hours prior to testing. The sample, adhesive stripe facing down, was placed on a horizontal test surface of a clean painted steel panel by aligning the adhesive stripe parallel to the top edge of the rectangular steel test panel. The adhesive bond is created with one cycle (two passes) of a 1.5 lb. sample roller (1.5 lb., 1.75 inch wide, radius of 1.875 inch, covered with a hard rubber coating). For each sample, data was collected with two different roll-down methods. The first method, called the "Shuffled" mode, simulates applying an even pressure from side-to-side across a front face of the sheet, which should not activate the adhesive. In this method, the roller was cycled directly over the adhesive stripe, and standoffs, in a direction parallel to the adhesive stripe and standoffs. As a result of the width of the roller being wider than the spacing between the standoffs, the roller spanned the standoffs and thus did not force the adhesive into contact with the test surface of the steel panel below. The "Activated" mode is the second roll-down method. In this case, the roller was cycled in a direction perpendicular to the adhesive stripe. In this case, the diameter of the roller is sufficiently small to fit between the standoffs, thus displacing the paper and forcing the adhesive into contact with the test surface of the steel

panel.

In both cases, the panel with the affixed sample was then disposed with its test surface at an acute angle of 60 degrees relative to horizontal, and a 100g weight was immediately attached to the non-adhered lower edge of the sample which had been adhered to the test surface. The time to failure (sample falling from the panel) was measured in seconds for each of four replicates. A different panel and sample was used for each replicate. The failure times were averaged for analysis.

Lap Shear Test

The lap sheet test method measures the force required to break an adhesive bond between sheets in shear under tension loading. An adhesive bond was created between two similar samples of the selectively activated sheet. Sheet test specimens were cut to two inches wide and three inches in length. A stripe of adhesive was placed on a back face of each sheet parallel to the short dimension of the sheet, near the upper edge. Specimens were equilibrated at constant temperature (22°C) and humidity (50%) for at least 24 hours prior to testing. A lap adhesive bond was created between sheets by aligning a first adhesive-backed sheet above a similar second adhesive-backed sheet, with the adhesive stripes facing down for both sheets. The top inch of the first sheet, which contained the adhesive strip, overlaped the bottom inch of the second sheet. The adhesive bond was created with one cycle (two passes) of a 1.5 lb sample roller. Data were collected for each sample by rolling in the Shuffled and Activated modes, as described above.

The bonded assembly was tested in tensile mode at a separation speed of one inch per minute, using a Sintech mechanical tester (available from MTS System Corporation, Eden Prarie, Minnesota). The peak load was recorded and averaged for four replicates.

Materials

The samples in the examples described below were constructed using Post-it® Restickable Index Cards, catalog number 6351; Post-it® Notes, catalog number 655; and Scotch® Magic Tape, catalog number 810, all available from 3M Company, St. Paul, Minnesota. The index cards samples are paper approximately 7.5 mils in thickness, three inches wide and five inches long. The paper is a 108 pound tag stock. A 0.6875 inch wide repositionable adhesive stripe is coated along the length of the long dimension of the sheet, adjacent to an upper edge thereof. In the unaltered form, the sheets do not have a selectively activated adhesive and consequently do not easily shuffle (i.e., they stick

together). The sheet samples formed from Post-it® Notes samples are similar to the index card sheet samples except that the paper thickness is 0.004 in and is a 20 pound bond. On the Post-it® Notes samples, the adhesive stripe is 0.6 inch wide along an upper edge of the sheet.

Selectively activated adhesive sheets were produced by laminating strips of Scotch® Magic tape to the index cards samples and the Post-it® Notes samples to produce standoffs of varying heights and separation spacings (adhesive stripe width), in formats similar to the sheet layout shown in FIGS. 21 and 22A. The tape standoffs were adhered to the paper parallel and on both sides of the adhesive stripe. In some cases, the tape standoff covered a portion of the adhesive. Standoffs greater than 0.002 inches in height were made by stacking layers of the Scotch® Magic tape.

Examples 1-2 and Comparative A

Tabs 1 and 2 illustrate the affect of standoff height on the ability to produce a selectively activated adhesive sheet. The dimensions and placement of the standoffs of each sample sheet are shown in Table 1. Example A had no standoffs at all. For Examples 1 and 2, the "upper" standoff was positioned along the top edge of the sheet on top of the adhesive stripe. The "lower" standoff was positioned parallel to the upper standoff, at distance equal to the adhesive stripe width perpendicular to the upper standoff. Although the standoff widths are not exactly equal, the variation shown does not dramatically affect the performance of the card.

Table 1.

Example	Paper Thickness , inches	Upper Standoff Width , inches	Upper Standoff Height , inches	Space Between Standoffs, Inches	Lower Standoff Width, Inches	Lower Standoff Height, Inches
A	0.0075	NA	NA	NA	NA	NA
1	0.0075	0.11	0.006	0.50	0.32	0.006
2	0.0075	0.06	0.002	0.50	0.75	0.002

Table 2.

Example	Standoff Height , inches	Distance Between Standoffs , inches	Lap Shear Test Activated Mode avg. lbs. (std. Deviation)	Lap Shear Test – Shuffled Mode avg. lbs. (std. deviation)	Static Angle Test – Activated Mode , avg. sec.	Static Angle Test – Shuffled Mode , avg. sec. (std. deviation)

					(std. deviation)	
A	NA	N/A	5.89 (0.96)	6.17 (1.55)	230 (31.1)	180 (96.5)
2	0.002	0.50	3.75 (0.29)	1.0 (0.28)	101.8 (40.9)	2.75 (0.97)
1	0.006	0.50	3.14 (0.39)	0.48 (0.46)	75.5 (6.7)	0.75 (0.96)

For Example A, the Activated and Shuffled modes produce similar responses. In both modes the sample sheets displayed moderate adhesion to another card and to a vertically suspended panel. The relatively large lap shear force and static angle hang time in the Shuffled mode indicates that the card will not shuffled satisfactorily. As shown in Examples 2 and 3, the addition of a standoff to both sides of the adhesive stripe allows the adhesive to be activated in some cases, as indicated by the differing performance between the two modes. When compared to Example A, the lap shear force and static angle hang time is significantly reduced in the Shuffled mode for Examples 2 and 3, which permitted shuffling of the sample sheets. Although the lap shear force and static angle hang times in the Activated mode are reduced for Examples 1 and 2, as compared to Example A, they are sufficient to adhere the sample sheet to a surface if desired. Increasing the standoff height spaces the adhesive further away from the bonding surface, and is thus more difficult to activate the adhesive, as indicated by the reduced lap shear forces and static angle holding times for both modes.

Examples 3-5

Examples 3-5 illustrate the affect of the distance between standoffs on the ability to produce a selectively activated adhesive sheet. The dimensions and placement of the standoffs of each example are shown in Table 3. The "upper" standoff was positioned along the top edge of the sheet on top of the adhesive stripe. The "lower" standoff was positioned parallel to the upper standoff, at distance equal to the adhesive stripe width perpendicular to the upper standoff.

The test results, for Example 3-5 are shown in Table 4. Increasing the distance between the standoffs allows more of the adhesive area to contact a bonding surface, thus increasing the lap shear force and static angle holding times. Example 3 illustrates that an adhesive stripe width of 0.25 inch is not sufficiently large enough to activate the adhesive using the roll down method described. Although samples of this sheet shuffled well, they did not display sufficient ability to adhere and hang on a vertical surface.

Table 3.

	108 lb Tag	Top	Top	Distance	Bottom	Bottom

Example	stock Paper Thickness , inches	Standoff Width , inches	Standoff Height , inches	Between Standoffs, Inches	Standoff Width, Inches	Standoff Height, Inches
3	0.0075	0.11	0.006	0.25	0.25	0.006
4	0.0075	0.11	0.006	0.50	0.32	0.006
5	0.0075	0.11	0.006	0.75	0.267	0.006

Table 4.

Example	Standoff Height , inches	Distance Between Standoffs , inches	Lap Shear Test– Activated Mode avg. lbs. (std. deviation)	Lap Shear Test– Shuffled Mode avg. lbs. (std. deviation)	Static Angle Test – Activated Mode, avg. sec. (std. deviation)	Static Angle Test – Shuffled Mode, avg. sec. (std. deviation)
3	0.006	0.25	0.43 (0.24)	0 (0)	0 (0)	0 (0)
4	0.006	0.50	3.14 (0.39)	0.48 (0.46)	75.5 (6.7)	0.75 (0.96)
5	0.006	0.75	3.13 (0.57)	0.67 (0.45)	169.3 (35.3)	0 (0)

Examples 6-7 and Comparatives A and B

Tables 5 and 6 illustrate the affect of paper thickness on the ability to produce a selectively activated adhesive sheet. The sample sheet dimensions are shown in Table 5. Examples A and B had no standoffs at all, where Example A is an index card sample and Example B is a note sheet sample. Test results are shown in Table 6. The difference in lap shear force and static angle holding time for both modes between Example 6 and Example A is larger than that between Example 7 and Example B as a result of the increased paper thickness. As the stiffness of the sample paper was decreased, the ability to form an adhesive bond for both modes increased and ultimately rendered the sheet unshuffleable. Examples 6 and 7 have large lap shear forces and static angle holding times in the Activated modes, relative to Examples A and B, respectively, and correspondingly low values in the Shuffled mode, which enable the sheets to be shuffled and also mounted to a surface.

Table 5.

Example	Paper Thickness , inches	Top Standoff Width , inches	Top Standoff Height , inches	Distance Between Standoffs, Inches	Bottom Standoff Width, Inches	Bottom Standoff Height, Inches
A	0.0075	NA	NA	NA	NA	NA

6	0.0075	0.11	0.006	0.75	0.75	0.006
B	0.004	NA	NA	NA	NA	NA
7	0.004	0.85	0.006	0.75	0.75	0.006

Table 6.

Example	Paper Thickness, inches	Lap Shear Test– Activated Mode avg. lbs. (std. deviation)	Lap Shear Test– Shuffled Mode avg. lbs. (std. deviation)	Static Angle Test – Activated Mode , avg. sec. (std. deviation)	Static Angle Test – Shuffled Mode , avg. sec. (std. deviation)
A	0.0075	5.89 (0.96)	6.17 (1.55)	230 (31.1)	180 (96.5)
6	0.0075	3.13 (0.57)	0.67 (0.46)	169.3 (35.3)	0 (0)
B	0.004	4.36 (0.26)	4.03 (0.49)	345.7 (62.8)	404 (67.9)
7	0.004	3.78 (1.6)	1.22 (0.22)	351.8 (78.7)	6.25 (10)

Although the present invention has been described with reference to preferred embodiments, workers skilled in the art will recognize that changes may be made in form and detail without departing from the spirit and scope of the invention.